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Carboxylic acid

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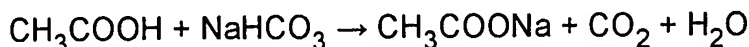
(where R is a hydrogen or an organic group)

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In [chemical formulas](#), these groups are typically represented as **COOH**. Molecules containing such a functional group are also called carboxylic acids or **organic acids**.

As the name implies, they are [acids](#); the two [electronegative](#) oxygen atoms pull the electron away from the hydrogen of the [hydroxyl](#) group and the remaining [proton](#) can easily leave. The remaining negative charge will then be distributed symmetrically among the two oxygen atoms and the two carbon-oxygen [bonds](#) take on a partial double bond character. This is a result of the resonance structure created by the [carbonyl](#) component of the carboxylic acid, without which the OH group does not as easily lose its H (see [alcohol](#)). The resulting [ion](#) is typically named with the suffix "-ate", so [acetic acid](#) for example turns into acetate.

Carboxylic acids react with [bases](#) to form carboxylate [salts](#), in which the hydrogen of the -OH group is replaced with a metal [ion](#). Thus, ethanoic/acetic acid (vinegar) reacts with [sodium bicarbonate](#) (baking soda) to form sodium ethanoate (sodium acetate), [carbon dioxide](#), and water:



Carboxyl groups also react with [amine](#) groups to form [peptide bonds](#), and with [alcohols](#) to form [esters](#).

Some carboxylic acids include:

- HCOOH [formic acid](#) (found in insect stings, *formic* refers to [ants](#))
- CH_3COOH [acetic](#) or ethanoic acid (found in [vinegar](#))
- $\text{CH}_3\text{CH}_2\text{COOH}$ propanoic acid
- $\text{C}_6\text{H}_5\text{COOH}$ [benzoic acid](#) (sodium benzoate, the sodium salt of benzoic acid is used as a food preservative)
- lactic acid

- all [amino acids](#)
- all [fatty acids](#)

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